
Issue 83: Control Room Habitability (Rev. 3)

DESCRIPTION

Historical Background

On August 18, 1982, the ACRS issued a letter¹ to the Commission which: (1) identified deficiencies in the maintenance and testing of engineered safety features designed to maintain control room habitability; (2) provided examples of design and installation errors, including inadvertent degradation of control room leak tightness; and (3) cited a shortage of NRC and licensee personnel knowledgeable about HVAC systems and nuclear air-cleaning technology. These ACRS concerns encompassed both plant licensing review

and operations/inspection activities. In January 1983, the staff responded^{4,36} to the ACRS concerns and recommended increased training of NRC and licensee personnel in inspection and testing of control room habitability systems. The staff also provided a profile of control room HVAC system component failures based on an analysis of LERs from 1977 through mid-1982. On April 28, 1983, NRR and OIE representatives met with the ACRS Subcommittee on Reactor Radiological Effects to discuss the staff response.

In May 1983, the ACRS issued a letter² to the EDO which expressed continuing concerns about control room habitability and provided both general and specific comments and recommendations for further staff evaluation.

In July 1983, NRR transmitted to the EDO a joint NRR/OIE proposal³ for evaluating the ACRS comments and recommendations and the adequacy of the control room habitability licensing review process and criteria.

In August 1983, the EDO indicated agreement⁴ with the proposal and directed NRR to coordinate with OIE and the NRC Regional Offices to complete the program and submit a report to the EDO by June 1, 1984. In

September 1983, NRR established⁵ a Control Room Habitability Working Group and a Steering Group for conducting and guiding the proposed review. Other generic issues that addressed related concerns were B-36, B-66, and III.D.3.4.

Safety Significance

Loss of control room habitability following an accident release of external airborne toxic or radioactive material or smoke can impair or cause loss of the control room operators' capability to safely control the reactor and could lead to a core-damage accident. Use of the remote shutdown station outside the control room following such events is unreliable since this station has no emergency habitability or radiation protection provisions similar to the control room.

Possible Solution

The Control Room Habitability Work Group was expected to identify any recommended actions that would

¹ Letter to N. Palladino from P. Shewmon, "Control Room Habitability," August 18, 1982. [8207180073]

² Letter to W. Dircks from J. Ebersole, "ACRS Subcommittee Report on Control Room Habitability," May 17, 1983. [8305260104]

³ Memorandum for W. Dircks from H. Denton, "Control Room Habitability," July 27, 1983. [8308180433]

⁴ Memorandum for H. Denton from W. Dircks, "Control Room Habitability," August 15, 1983. [8309160034]

⁵ Memorandum for T. Murley et al. from H. Denton, "Control Room Habitability," September 19, 1983. [8310120463]

correct significant deficiencies in control room habitability design, installation, test, or maintenance.

CONCLUSION

In June 1984, NRR provided a report⁶ to the EDO along with its plans for implementing the recommendations of the report, including a survey of several operating plants. Based on the ongoing staff work, it was concluded

that a solution had been identified and a schedule⁷ for the resolution of the issue was developed by DSI/NRR.

PNL completed a report⁸ entitled "A Probabilistic Examination of Nuclear Power Plant Control Room Habitability During Various Accident Scenarios," and the findings of the survey of operating plants were published in NUREG/CR-4960.⁹ As a result of these studies, it was recognized that the methodology used to evaluate control room habitability system design needed improvement. Accordingly, the staff initiated

activities to develop: (1) improved methods for calculating control room dose and exposure levels; (2) improved meteorological models for use in control room habitability calculations; and (3) revised exposure limits to toxic gases for control room operators.

The results of the improved methods were documented in NUREG/CR-5669¹⁰ and NUREG/CR-6210¹¹ and the HABIT Code was developed to provide an integrated code package for evaluating control room habitability.

NUREG-1465,¹² published with the resolution of Issue 155.1, will provide updated source term information for

the evaluation of control room designs. As recommended¹³ by the ACRS, the staff was expected to consider NIOSH recommendations for toxic chemicals in its revision of Regulatory Guide 1.78.¹⁴ Thus, this issue was

RESOLVED with no new requirements.¹⁵ Consideration of a license renewal period of 20 years would not have changed this conclusion.

⁶ Memorandum for W. Dircks from H. Denton, "Control Room Habitability," June 29, 1984. [8407100196]

⁷ Memorandum for T. Speis from R. Bernero, "Revised Schedule for Generic Issue 83, Control Room Habitability," September 28, 1984. [8410110484]

⁸ Letter to W. Milstead (U.S. Nuclear Regulatory Commission,) from T. Powers (Pacific Northwest Laboratory), "A Probabilistic Examination of Nuclear Power Plant Control Room Habitability During Various Accident Scenarios," December 3, 1984. [8412050472]

⁹ NUREG/CR-4960, "Control Room Habitability Survey of Licensed Commercial Nuclear Power Generating Stations," U.S. Nuclear Regulatory Commission, October 1988.

¹⁰ NUREG/CR-5669, "Evaluation of Exposure Limits to Toxic Gases for Nuclear Reactor Control Room Operators," U.S. Nuclear Regulatory Commission, July 1991.

¹¹ NUREG/CR-6210, "Computer Codes for Evaluation of Control Room Habitability (HABIT)," U.S. Nuclear Regulatory Commission, June 1996.

¹² NUREG-1465, "Accident Source Terms for Light- Water Nuclear Power Plants," U.S. Nuclear Regulatory Commission, February 1995.

¹³ Letter to T. Kress from J. Taylor, "Resolution of Generic Safety Issue 83, 'Control Room Habitability,'" September 13, 1995. [9605130222, 9605150092]

¹⁴ Regulatory Guide 1.78, "Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," U.S. Nuclear Regulatory Commission, June 1974. [8001240567]

¹⁵ Memorandum for J. Taylor from D. Morrison, "Resolution of Generic Safety Issue 83, "Control Room Habitability,'" June 17, 1996. [9607250277]

However, in June 2003, NRC Generic Letter 2003-01¹⁶ was issued to address findings at U.S. nuclear power plants which suggested that licensees may not have been meeting the control room licensing and design bases, and applicable regulatory requirements, and existing TS surveillance requirements may not have been adequate. The affected licensees were requested to submit information demonstrating that their control rooms complied with existing licensing and design bases, and applicable regulatory requirements, and that suitable design, maintenance, and testing control measures were in place.

¹⁶ Generic Letter 2003-01, "Control Room Habitability," U.S. Nuclear Regulatory Commission, June 12, 2003. [[ML031620248](#)]

